Application No. 10/075,145
Attorney Docket No. 12472US01

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

LISTING OF CLAIMS

1. (Original) In a communication system suitable to receive a communication signal comprising first data compressed at a compression level within a first range of compression levels and second data compressed at a compression level within a second range of compression levels, the first range of compression levels being greater than the second range of compression levels, apparatus arranged to enhance the quality of the communication signal comprising:

a mode detector responsive to the first data to generate a first mode signal and responsive to the second data to generate a second mode signal;

a signal decoder responsive to the first mode signal to generate decoded first data having a compression level less than the first range of compression levels;

an analyzer responsive to the first mode signal and the decoded first data to generate a first analyzer signal in the event that the first data is deemed suitable for a first type of enhancement and to generate a second analyzer signal in the event that the first data is deemed suitable for a second type of enhancement, the analyzer being responsive to the second mode signal and second data to generate a third analyzer signal in the event that the second data is deemed suitable for a third type of enhancement and to generate a fourth

analyzer signal in the event that the second data is deemed suitable for a fourth type of enhancement;

an enhancement processor responsive to the first analyzer signal and the decoded first data to generate enhanced decoded first data enhanced with the first type of enhancement, responsive to the second analyzer signal and the first data to generate enhanced first data enhanced with the second type of enhancement, responsive to the third analyzer signal and the second data to generate enhanced second data enhanced with the third type of enhancement and responsive to the fourth analyzer signal and the second data to generate enhanced second data enhanced with the fourth type of enhancement; and

an encoder encoding the enhanced decoded first data to form encoded enhanced first data having a compression level within the first range of compression levels.

2. (Original) Apparatus, as claimed in claim 1, wherein the second and third types of enhancement are identical and wherein the first and fourth types of enhancement are identical.

3. (Original) Apparatus, as claimed in claim 1, wherein the enhancement processor generates the enhanced first data while being unresponsive to the decoded first data.

4. (Original) Apparatus, as claimed in claim 1, wherein the enhancement processor generates the enhanced first data in response to the decoded first data and the first data.

5. (Original) Apparatus, as claimed in claim 1, wherein the enhancement processor generates the enhanced decoded first data and the enhanced second data with linear VBE processing.

6. (Original) Apparatus, as claimed in claim 1, wherein the enhancement processor generates the enhanced first data at least in part with native mode processing.

7. (Original) Apparatus, as claimed in claim 1, wherein the communication signal comprises the first data combined with third data within the second range of compression levels, wherein the decoder generates the decoded first data in response to the first mode signal and the first data, and wherein the enhancement processor generates the enhanced first data by generating first processor enhanced data in response to the second analyzer signal and the first data, by generating second processor enhanced data in response to the second analyzer signal and the third data and by combining the first and second processor enhanced data.

8. (Original) Apparatus, as claimed in claim 7, wherein the enhancement processor applies the same type of enhancement to the first and third data.

9. (Original) Apparatus, as claimed in claim 7, wherein the enhancement processor generates the first processor enhanced data while being unresponsive to the decoded first data.

10. (Original) Apparatus, as claimed in claim 7, wherein the enhancement processor generates the first processor enhanced data in response to the decoded first data and the first data.

11. (Original) Apparatus, as claimed in claim 7, wherein the third data comprises pulse code modulation data.

12. (Original) Apparatus, as claimed in claim 1, wherein the communication signal comprises the first data combined with third data within the second range of compression levels, wherein the signal decoder is responsive to the first mode signal and the first data to generate the decoded first data, wherein the analyzer is responsive to the first mode signal and the decoded first data to generate the second

analyzer signal and wherein the enhancement processor generates the enhanced first data by generating first processor enhanced data in response to the second analyzer signal and the decoded first data, by generating second processor enhanced data in response to the second analyzer signal and the third data and by combining the first and second processor enhanced data.

13. (Original) Apparatus, as claimed in claim 12, wherein the third data comprises pulse code modulation data.

14. (Original) Apparatus, as claimed in claim 1, wherein the first type of enhancement comprises at least one of echo suppression with noise injection, echo cancellation, noise reduction, adaptive noise cancellation and automatic level control, the second type of enhancement comprises automatic level control, the third type of enhancement comprises automatic level control and the fourth type of enhancement comprises at least one of echo suppression with noise injection, echo cancellation, noise reduction, adaptive noise cancellation and automatic level control.

15. (Original) Apparatus, as claimed in claim 1, wherein the analyzer is responsive to one or more predetermined characteristics of the decoded first data selected from the group consisting of voice activity, long term power, short term power, double

talk, spectral content, noise power, signal power, echo return loss, pitch, and signal to noise ratio.

16. (Original) Apparatus, as claimed in claim 1, and further comprising a delay buffer which inserts sufficient delay so that the delay through the system remains substantially the same when the system transitions from generating the enhanced first data enhanced with the second type of enhancement to generating the enhanced decoded first data enhanced with the first type of enhancement.

17. (Original) Apparatus, as claimed in claim 16, wherein the delay buffer stores a first portion of the first data during generation of the enhanced first data enhanced with the second type of enhancement and stores less than the first portion of the first data during generation of the enhanced decoded first data enhanced with the first type of enhancement.

18. (Original) Apparatus, as claimed in claim 1, and further comprising output metrics responsive to the enhanced decoded first data and the enhanced first data arranged to transmit data representing benefits associated with generating the encoded enhanced first data or the enhanced first data.

19. (Original) Apparatus, as claimed in claim 1, and further comprising a buffer arranged to store at least some of the enhanced decoded first data, wherein the first data is organized into frames, wherein the encoder selects a portion of the stored enhanced decoded first data corresponding to at least portions of two of the frames to generate a complete frame of the encoded enhanced first data.

20. (Original) Apparatus, as claimed in claim 19, wherein the decoder decodes the first data into an unframed linear stream of signals.

21. (Original) Apparatus, as claimed in claim 19, wherein the portion of the stored enhanced decoded first data used to generate the complete frame depends at least in part on the time required to form the encoded enhanced first data.

22. (Original) Apparatus, as claimed in claim 21, wherein the frames comprise a first frame and a subsequent second frame adjacent the first frame, wherein the first analyzer signal is generated during the second frame and wherein the buffer stores portions of the stored enhanced decoded first data derived from the first frame and the second frame.

23. (Original) Apparatus, as claimed in claim 21, wherein the frames comprise a first frame and a subsequent second frame adjacent the first frame, wherein the first analyzer signal is generated during the first frame and wherein the buffer stores portions of the stored enhanced decoded first data derived from the first frame and the second frame.

24. (Original) Apparatus, as claimed in claim 21, wherein the analyzer generates a fifth analyzer signal in the event that the first data is deemed no longer suitable for the first type of enhancement, the frames of first data comprise a first frame, a subsequent second frame adjacent the first frame, a subsequent third frame adjacent the second frame and a subsequent fourth frame adjacent the third frame, wherein the fifth analyzer signal is generated during the third frame, wherein the buffer stores portions of the stored enhanced decoded first data derived from the first frame and the second frame, and wherein the fourth frame of the first data is substituted for the encoded enhanced first data.

25. (Original) Apparatus, as claimed in claim 1, wherein the analyzer comprises a speech activity detector and wherein the first analyzer signal is generated in response to the speech activity detector.

26. (Original) Apparatus, as claimed in claim 1, wherein the first data comprises control data, and the apparatus further comprising a message processor arranged to remove the control data from the first data, to store the control data and to reinsert the control data into the enhanced decoded first data to form the encoded enhanced first data.

27. (Currently Amended) In a communication system comprising a first telephone and a second telephone, apparatus arranged to enable communication between the first telephone and second telephone comprising:

a first processor comprising signal enhancement apparatus arranged to enhance signals transmitted in a first direction and in a second direction opposite the first direction;

a second processor comprising signal enhancement apparatus arranged to enhance signals transmitted in the first direction and the second direction;

a first path connecting the first and second processors in parallel ~~tandem~~ during a connection between the first and second telephones; and

a switch arranged to disable the signal enhancement apparatus for one of the first and second processors for signals transmitted in the first direction during the connection and to disable the signal enhancement apparatus for one of the first and second processors for signals transmitted in the second direction during the connection.

28. (Original) Apparatus, as claimed in claim 27, wherein the first and second telephones comprise mobile telephones.

29. (Original) Apparatus, as claimed in claim 27, wherein the first and second telephones comprise public switched telephone network telephones.

30. (Original) Apparatus, as claimed in claim 27, wherein the switch comprises a software switch.

31. (Original) Apparatus, as claimed in claim 27, wherein the system employs tandem free operation and wherein the communication is carried out at least in part with compressed speech signals.

32. (Original) In a communication system arranged to receive a communication signal comprising first data compressed at a compression level within a first range of compression levels and second data compressed at a compression level within a second range of compression levels, the first range of compression levels being greater than the second range of compression levels, a method of enhancing the quality of the communication signal comprising:

generating a first mode signal in response to the first data;

generating a second mode signal in response to the second data;

generating decoded first data having a compression level less than the first range of compression levels in response to the first mode signal;

generating a first analyzer signal in the event that the first data is deemed suitable for a first type of enhancement in response to the first mode signal and the decoded first data;

generating a second analyzer signal in the event that the first data is deemed suitable for a second type of enhancement in response to the first mode signal and the decoded first data;

generating a third analyzer signal in the event that the second data is deemed suitable for a third type of enhancement in response to the second mode signal and second data;

generating a fourth analyzer signal in the event that the second data is deemed suitable for a fourth type of enhancement in response to the second mode signal and second data;

generating enhanced decoded first data enhanced with the first type of enhancement in response to the first analyzer signal and the decoded first data;

generating enhanced first data enhanced with the second type of enhancement in response to the second analyzer signal and the first data;

generating enhanced second data enhanced with the third type of enhancement in response to the third analyzer signal and the second data;

generating enhanced second data enhanced with the fourth type of enhancement in response to the fourth analyzer signal and the second data; and

encoding the enhanced decoded first data to form encoded enhanced first data having a compression level within the first range of compression levels.

33. (Original) A method, as claimed in claim 32, wherein the second and third types of enhancement are identical and wherein the first and fourth types of enhancement are identical.

34. (Original) A method, as claimed in claim 32, wherein the generating enhanced first data comprises generating the enhanced first data while being unresponsive to the decoded first data.

35. (Original) A method, as claimed in claim 32, wherein the generating the enhanced first data comprises generating the enhanced first data in response to the decoded first data and the first data.

36. (Original) A method, as claimed in claim 32, wherein the generating enhanced decoded first data and the generating enhanced second data each comprises generating with linear VBE processing.

37. (Original) A method, as claimed in claim 32, wherein the generating enhanced first data comprises generating enhanced first data at least in part with native mode processing.

38. (Original) A method, as claimed in claim 32, wherein the communication signal comprises the first data combined with third data within the second range of compression levels, wherein the generating decoded first data comprises generating decoded first data in response to the first mode signal and the first data, and wherein the generating enhanced first data comprises:

generating first processor enhanced data in response to the second analyzer signal and the first data;

generating second processor enhanced data in response to the second analyzer signal and the third data; and

combining the first and second processor enhanced data.

39. (Original) A method, as claimed in claim 38, wherein the generating first processor enhanced data and the generating second processor enhanced data each comprises applying the same type of enhancement to the first and third data.

40. (Original) A method, as claimed in claim 38, wherein the generating first processor enhanced data comprises generating the first processor enhanced data while being unresponsive to the decoded first data.

41. (Original) A method, as claimed in claim 38, wherein the generating first processor enhanced data comprises generating the first processor enhanced data in response to the decoded first data and the first data.

42. (Original) A method, as claimed in claim 38, wherein the third data comprises pulse code modulation data.

43. (Original) A method, as claimed in claim 32, wherein the communication signal comprises the first data combined with third data within the second range of compression levels, wherein the generating decoded first data comprises generating the decoded first data in response to the first mode signal and the first data, wherein the generating a second analyzer signal comprises generating the second analyzer

signal in response to the first mode signal and the decoded first data and wherein the generating enhanced first data comprises:

generating first processor enhanced data in response to the second analyzer signal and the decoded first data;

generating second processor enhanced data in response to the second analyzer signal and the third data; and

combining the first and second processor enhanced data.

44. (Original) A method, as claimed in claim 43, wherein the third data comprises pulse code modulation data.

45. (Original) A method, as claimed in claim 32, wherein the first type of enhancement comprises at least one of echo suppression with noise injection, echo cancellation, noise reduction, adaptive noise cancellation and automatic level control, the second type of enhancement comprises automatic level control, the third type of enhancement comprises automatic level control and the fourth type of enhancement comprises at least one of echo suppression with noise injection, echo cancellation, noise reduction, adaptive noise cancellation and automatic level control.

46. (Original) A method, as claimed in claim 32, wherein the generating a first analyzer signal and generating a second analyzer signal comprises generating the first and second analyzer signals in response to one or more predetermined characteristics of the decoded first data selected from the group consisting of voice activity, long term power, short term power, double talk, spectral content, noise power, signal power, echo return loss, pitch, and signal to noise ratio.

47. (Original) A method, as claimed in claim 32, and further comprising inserting sufficient delay into the system so that the delay through the system remains substantially the same when the system transitions from the generating enhanced first data enhanced with the second type of enhancement to the generating enhanced decoded first data enhanced with the first type of enhancement.

48. (Original) A method, as claimed in claim 47, wherein the inserting sufficient delay comprises storing a first portion of the first data during the generating enhanced first data enhanced with the second type of enhancement and storing less than the first portion of the first data during the generating enhanced decoded first data enhanced with the first type of enhancement.

49. (Original) A method, as claimed in claim 32, and further comprising generating output metrics data representing benefits associated with the generating encoded enhanced first data or the generating enhanced first data in response to the enhanced decoded first data and the enhanced first data.

50. (Original) A method, as claimed in claim 32, wherein the first data is organized into frames and further comprising:

storing at least some of the enhanced decoded first data; and

selecting a portion of the stored enhanced decoded first data corresponding to at least portions of two of the frames to generate a complete frame of the encoded enhanced first data.

51. (Original) A method, as claimed in claim 50, and further comprising decoding the first data into an unframed linear stream of signals.

52. (Original) A method, as claimed in claim 50, wherein the selecting a portion of the stored enhanced decoded first data comprises selecting a portion of the stored enhanced decoded first data that depends at least in part on the time required to form the encoded enhanced first data.

53. (Original) A method, as claimed in claim 52, wherein the frames comprise a first frame and a subsequent second frame adjacent the first frame, wherein the generating a first analyzer signal occurs during the second frame and wherein the storing at least some of the enhanced decoded first data comprises deriving at least some of the enhanced decoded first data from the first frame and the second frame.

54. (Original) A method, as claimed in claim 52, wherein the frames comprise a first frame and a subsequent second frame adjacent the first frame, wherein the generating a first analyzer signal occurs during the first frame and wherein the storing at least some of the enhanced decoded first data comprises deriving at least some of the enhanced decoded first data from the first frame and the second frame.

55. (Original) A method, as claimed in claim 52, and further comprising generating a fifth analyzer signal in the event that the first data is deemed no longer suitable for the first type of enhancement, wherein the frames of first data comprise a first frame, a subsequent second frame adjacent the first frame, a subsequent third frame adjacent the second frame and a subsequent fourth frame adjacent the third frame, wherein the generating a fifth analyzer signal occurs during the third frame, wherein the storing at least some of the enhanced decoded first data comprises deriving the enhanced decoded

first data from the first frame and the second frame, and wherein the fourth frame of the first data is substituted for the encoded enhanced first data.

56. (Original) A method, as claimed in claim 32, and further comprising detecting speech activity, wherein the generating a first analyzer signal comprises generating the first analyzer signal in response to the detecting speech activity.

57. (Original) A method, as claimed in claim 32, wherein the first data comprises control data, and further comprising extracting the control data from the first data, storing the control data and reinserting the control data into the enhanced decoded first data to form the encoded enhanced first data.

58. (Currently Amended) In a communication system comprising a first telephone and a second telephone, a method of enabling communication by signals transmitted between the first telephone and second telephone in a first direction and in a second direction opposite the first direction comprising:

enhancing the signals transmitted in the first direction using a first processor;

enhancing the signals transmitted in the second direction using a second processor;

wherein said first processor and said second processor are connected in parallel ~~tandem~~ during communication between the first and second telephones; and

disabling a portion of the enhancing for the signals transmitted in the first direction and disabling a portion of the enhancing for the signals transmitted in the second direction in the event that the signals comprise data at a predetermined compression level.

59. (Original) A method, as claimed in claim 58, wherein the first and second telephones comprise mobile telephones.

60. (Original) A method, as claimed in claim 58, wherein the first and second telephones comprise public switched telephone network telephones.

61. (Original) A method, as claimed in claim 58, wherein the disabling comprises software switching.

62. (Original) A method, as claimed in claim 58, wherein the predetermined compression level comprises a compression level employed in tandem free operation.

63. (Original) In a communication system arranged to receive a communication signal comprising first data compressed at a compression level within a first range of compression levels and second data compressed at a compression level within a second range of compression levels, the first range of compression levels being greater than the second range of compression levels, apparatus arranged to enhance the quality of the communication signal comprising:

means for generating a first mode signal in response to the first data and for generating a second mode signal in response to the second data;

means for generating decoded first data having a compression level less than the first range of compression levels in response to the first mode signal;

means for generating a first analyzer signal in the event that the first data is deemed suitable for a first type of enhancement in response to the first mode signal and the decoded first data, for generating a second analyzer signal in the event that the first data is deemed suitable for a second type of enhancement in response to the first mode signal and the decoded first data, for generating a third analyzer signal in the event that the second data is deemed suitable for a third type of enhancement in response to the second mode signal and second data and for generating a fourth analyzer signal in the event that the second data is deemed suitable for a fourth type of enhancement in response to the second mode signal and second data;

means for generating enhanced decoded first data enhanced with the first type of enhancement in response to the first analyzer signal and the decoded first data, for generating enhanced first data enhanced with the second type of enhancement in response to the second analyzer signal and the first data, for generating enhanced second data enhanced with the third type of enhancement in response to the third analyzer signal and the second data, for generating enhanced second data enhanced with the fourth type of enhancement in response to the fourth analyzer signal and the second data; and

means for encoding the enhanced decoded first data to form encoded enhanced first data having a compression level within the first range of compression levels.

64. (Original) Apparatus, as claimed in claim 63, wherein the second and third types of enhancement are identical and wherein the first and fourth types of enhancement are identical.

65. (Original) Apparatus, as claimed in claim 63, wherein the means for generating enhanced first data comprises means for generating the enhanced first data while being unresponsive to the decoded first data.

66. (Original) Apparatus, as claimed in claim 63, wherein the means for generating enhanced first data comprises means for generating the enhanced first data in response to the decoded first data and the first data.

67. (Original) Apparatus, as claimed in claim 63, wherein the means for generating enhanced decoded first data and for generating enhanced second data comprises means for generating with linear VBE processing.

68. (Original) Apparatus, as claimed in claim 63, wherein the means for generating enhanced first data comprises generating enhanced first data at least in part with native mode processing.

69. (Original) Apparatus, as claimed in claim 63, wherein the communication signal comprises the first data combined with third data within the second range of compression levels, wherein the generating decoded first data comprises generating decoded first data in response to the first mode signal and the first data, and wherein the means for generating enhanced first data comprises:

means for generating first processor enhanced data in response to the second analyzer signal and the first data;

means for generating second processor enhanced data in response to the second analyzer signal and the third data; and

means for combining the first and second processor enhanced data.

70. (Original) Apparatus, as claimed in claim 69, wherein the means for generating first processor enhanced data and the means for generating second processor enhanced data each comprises means for applying the same type of enhancement to the first and third data.

71. (Original) Apparatus, as claimed in claim 69, wherein the means for generating first processor enhanced data comprises means for generating the first processor enhanced data while being unresponsive to the decoded first data.

72. (Original) Apparatus, as claimed in claim 69, wherein the means for generating first processor enhanced data comprises means for generating the first processor enhanced data in response to the decoded first data and the first data.

73. (Original) Apparatus, as claimed in claim 69, wherein the third data comprises pulse code modulation data.

74. (Original) Apparatus, as claimed in claim 63, wherein the communication signal comprises the first data combined with third data within the second range of compression levels, wherein the means for generating decoded first data comprises means for generating the decoded first data in response to the first mode signal and the first data, wherein the means for generating a second analyzer signal comprises means for generating the second analyzer signal in response to the first mode signal and the decoded first data and wherein the means for generating enhanced first data comprises:

means for generating first processor enhanced data in response to the second analyzer signal and the decoded first data;

means for generating second processor enhanced data in response to the second analyzer signal and the third data; and

means for combining the first and second processor enhanced data.

75. (Original) Apparatus, as claimed in claim 74, wherein the third data comprises pulse code modulation data.

76. (Original) Apparatus, as claimed in claim 63, wherein the first type of enhancement comprises at least one of echo suppression with noise injection, echo cancellation, noise reduction, adaptive noise cancellation and automatic level control, the second type of enhancement comprises automatic level control, the third type of

enhancement comprises automatic level control and the fourth type of enhancement comprises at least one of echo suppression with noise injection, echo cancellation, noise reduction, adaptive noise cancellation and automatic level control.

77. (Original) Apparatus, as claimed in claim 63, wherein the means for generating a first analyzer signal and for generating a second analyzer signal comprises means for generating the first and second analyzer signals in response to one or more predetermined characteristics of the decoded first data selected from the group consisting of voice activity, long term power, short term power, double talk, spectral content, noise power, signal power, echo return loss, pitch, and signal to noise ratio.

78. (Original) Apparatus, as claimed in claim 63, and further comprising means for inserting sufficient delay into the system so that the delay through the system remains substantially the same when the system transitions from the generating enhanced first data enhanced with the second type of enhancement to the generating enhanced decoded first data enhanced with the first type of enhancement.

79. (Original) Apparatus, as claimed in claim 78, wherein the means for inserting sufficient delay comprises means for storing a first portion of the first data during the generating enhanced first data enhanced with the second type of enhancement and for

storing less than the first portion of the first data during the generating enhanced decoded first data enhanced with the first type of enhancement.

80. (Original) Apparatus, as claimed in claim 63, and further comprising means for generating output metrics data representing benefits associated with the encoded enhanced first data or the enhanced first data in response to the enhanced decoded first data and the enhanced first data.

81. (Original) Apparatus, as claimed in claim 63, wherein the first data is organized into frames and further comprising:

means for storing at least some of the enhanced decoded first data; and

means for selecting a portion of the stored enhanced decoded first data corresponding to at least portions of two of the frames to generate a complete frame of the encoded enhanced first data.

82. (Original) Apparatus, as claimed in claim 81, and further comprising means for decoding the first data into an unframed linear stream of signals.

83. (Original) Apparatus, as claimed in claim 81, wherein the means for selecting a portion of the stored enhanced decoded first data comprises means for selecting

a portion of the stored enhanced decoded first data that depends at least in part on the time required to form the encoded enhanced first data.

84. (Original) Apparatus, as claimed in claim 83, wherein the frames comprise a first frame and a subsequent second frame adjacent the first frame, wherein the first analyzer signal occurs during the second frame and wherein the means for storing at least some of the enhanced decoded first data comprises means for deriving at least some of the enhanced decoded first data from the first frame and the second frame.

85. (Original) Apparatus, as claimed in claim 83, wherein the frames comprise a first frame and a subsequent second frame adjacent the first frame, wherein the first analyzer signal occurs during the first frame and wherein the means for storing at least some of the enhanced decoded first data comprises means for deriving at least some of the enhanced decoded first data from the first frame and the second frame.

86. (Original) Apparatus, as claimed in claim 83, and further comprising means for generating a fifth analyzer signal in the event that the first data is deemed no longer suitable for the first type of enhancement, wherein the frames of first data comprise a first frame, a subsequent second frame adjacent the first frame, a subsequent third frame adjacent the second frame and a subsequent fourth frame adjacent the third frame, wherein

the fifth analyzer signal occurs during the third frame, wherein the means for storing at least some of the enhanced decoded first data comprises means for deriving the enhanced decoded first data from the first frame and the second frame, and wherein the fourth frame of the first data is substituted for the encoded enhanced first data.

87. (Original) Apparatus, as claimed in claim 63, and further comprising means for detecting speech activity, wherein the means for generating a first analyzer signal comprises means for generating the first analyzer signal in response to the detecting of speech activity.

88. (Original) Apparatus, as claimed in claim 63, wherein the first data comprises control data, and further comprising means for extracting the control data from the first data, means for storing the control data and means for reinserting the control data into the enhanced decoded first data to form the encoded enhanced first data.

89. (Original) In a communication system comprising a first telephone and a second telephone, apparatus arranged to enable communication by signals transmitted between the first telephone and second telephone in a first direction and in a second direction opposite the first direction comprising:

means for enhancing the signals transmitted in the first direction and the second direction; and

means for disabling a portion of the enhancing for the signals transmitted in the first direction and for disabling a portion of the enhancing for the signals transmitted in the second direction in the event that the signals comprise data at a predetermined compression level.

90. (Original) Apparatus, as claimed in claim 89, wherein the first and second telephones comprise mobile telephones.

91. (Original) Apparatus, as claimed in claim 89, wherein the first and second telephones comprise public switched telephone network telephones.

92. (Original) Apparatus, as claimed in claim 89, wherein the means for disabling comprises means for software switching.

93. (Original) Apparatus, as claimed in claim 89, wherein the predetermined compression level comprises a compression level employed in tandem free operation.

94. (Original) A computer readable medium encoded with a computer program executable to perform functionality comprising:

generating a first mode signal in response to first data of a communication signal, the first data being compressed at a compression level within a first range of compression levels;

generating a second mode signal in response to the second data of the communication signal, the second data being compressed at a compression level within a second range of compression levels, the first range of compression levels being greater than the second range of compression levels;

generating decoded first data having a compression level less than the first range of compression levels in response to the first mode signal;

generating a first analyzer signal in the event that the first data is deemed suitable for a first type of enhancement in response to the first mode signal and the decoded first data;

generating a second analyzer signal in the event that the first data is deemed suitable for a second type of enhancement in response to the first mode signal and the decoded first data;

generating a third analyzer signal in the event that the second data is deemed suitable for a third type of enhancement in response to the second mode signal and second data;

generating a fourth analyzer signal in the event that the second data is deemed suitable for a fourth type of enhancement in response to the second mode signal and second data;

generating enhanced decoded first data enhanced with the first type of enhancement in response to the first analyzer signal and the decoded first data;

generating enhanced first data enhanced with the second type of enhancement in response to the second analyzer signal and the first data;

generating enhanced second data enhanced with the third type of enhancement in response to the third analyzer signal and the second data;

generating enhanced second data enhanced with the fourth type of enhancement in response to the fourth analyzer signal and the second data; and

encoding the enhanced decoded first data to form encoded enhanced first data having a compression level within the first range of compression levels.

95. (Original) A medium, as claimed in claim 94, wherein the second and third types of enhancement are identical and wherein the first and fourth types of enhancement are identical.

96. (Original) A medium, as claimed in claim 94, wherein the generating enhanced first data comprises generating the enhanced first data while being unresponsive to the decoded first data.

97. (Original) A medium, as claimed in claim 94, wherein the generating the enhanced first data comprises generating the enhanced first data in response to the decoded first data and the first data.

98. (Original) A medium, as claimed in claim 94, wherein the generating enhanced decoded first data and the generating enhanced second data each comprises generating with linear VBE processing.

99. (Original) A medium, as claimed in claim 94, wherein the generating enhanced first data comprises generating enhanced first data at least in part with native mode processing.

100. (Original) A medium, as claimed in claim 94, wherein the communication signal comprises the first data combined with third data within the second range of compression levels, wherein the generating decoded first data comprises

generating decoded first data in response to the first mode signal and the first data, and wherein the generating enhanced first data comprises:

generating first processor enhanced data in response to the second analyzer signal and the first data;

generating second processor enhanced data in response to the second analyzer signal and the third data; and

combining the first and second processor enhanced data.

101. (Original) A medium, as claimed in claim 100, wherein the generating first processor enhanced data and the generating second processor enhanced data each comprises applying the same type of enhancement to the first and third data.

102. (Original) A medium, as claimed in claim 100, wherein the generating first processor enhanced data comprises generating the first processor enhanced data while being unresponsive to the decoded first data.

103. (Original) A medium, as claimed in claim 100, wherein the generating first processor enhanced data comprises generating the first processor enhanced data in response to the decoded first data and the first data.

104. (Original) A medium, as claimed in claim 100, wherein the third data comprises pulse code modulation data.

105. (Original) A medium, as claimed in claim 94, wherein the communication signal comprises the first data combined with third data within the second range of compression levels, wherein the generating decoded first data comprises generating the decoded first data in response to the first mode signal and the first data, wherein the generating a second analyzer signal comprises generating the second analyzer signal in response to the first mode signal and the decoded first data and wherein the generating enhanced first data comprises:

generating first processor enhanced data in response to the second analyzer signal and the decoded first data;

generating second processor enhanced data in response to the second analyzer signal and the third data; and

combining the first and second processor enhanced data.

106. (Original) A medium, as claimed in claim 105, wherein the third data comprises pulse code modulation data.

107. (Original) A medium, as claimed in claim 94, wherein the first type of enhancement comprises at least one of echo suppression with noise injection, echo cancellation, noise reduction, adaptive noise cancellation and automatic level control, the second type of enhancement comprises automatic level control, the third type of enhancement comprises automatic level control and the fourth type of enhancement comprises at least one of echo suppression with noise injection, echo cancellation, noise reduction, adaptive noise cancellation and automatic level control.

108. (Original) A medium, as claimed in claim 94, wherein the generating a first analyzer signal and generating a second analyzer signal comprises generating the first and second analyzer signals in response to one or more predetermined characteristics of the decoded first data selected from the group consisting of voice activity, long term power, short term power, double talk, spectral content, noise power, signal power, echo return loss, pitch, and signal to noise ratio.

109. (Original) A medium, as claimed in claim 94, wherein the computer program further performs functionality comprising inserting sufficient delay into the system so that the delay through the system remains substantially the same when the system transitions from the generating enhanced first data enhanced with the second type

of enhancement to the generating enhanced decoded first data enhanced with the first type of enhancement.

110. (Original) A medium, as claimed in claim 109, wherein the inserting sufficient delay comprises storing a first portion of the first data during the generating enhanced first data enhanced with the second type of enhancement and storing less than the first portion of the first data during the generating enhanced decoded first data enhanced with the first type of enhancement.

111. (Original) A medium, as claimed in claim 94, wherein the computer program further performs functionality comprising generating output metrics data representing benefits associated with the generating encoded enhanced first data or the generating enhanced first data in response to the enhanced decoded first data and the enhanced first data.

112. (Original) A medium, as claimed in claim 94, wherein the first data is organized into frames and further comprising:

storing at least some of the enhanced decoded first data; and

selecting a portion of the stored enhanced decoded first data corresponding to at least portions of two of the frames to generate a complete frame of the encoded enhanced first data.

113. (Original) A medium, as claimed in claim 112, wherein the computer program further performs functionality comprising decoding the first data into an unframed linear stream of signals.

114. (Original) A medium, as claimed in claim 112, wherein the selecting a portion of the stored enhanced decoded first data comprises selecting a portion of the stored enhanced decoded first data that depends at least in part on the time required to form the encoded enhanced first data.

115. (Original) A medium, as claimed in claim 114, wherein the frames comprise a first frame and a subsequent second frame adjacent the first frame, wherein the generating a first analyzer signal occurs during the second frame and wherein the storing at least some of the enhanced decoded first data comprises deriving at least some of the enhanced decoded first data from the first frame and the second frame.

116. (Original) A medium, as claimed in claim 114, wherein the frames comprise a first frame and a subsequent second frame adjacent the first frame, wherein the generating a first analyzer signal occurs during the first frame and wherein the storing at least some of the enhanced decoded first data comprises deriving at least some of the enhanced decoded first data from the first frame and the second frame.

117. (Original) A medium, as claimed in claim 114, wherein the computer program further performs functionality comprising generating a fifth analyzer signal in the event that the first data is deemed no longer suitable for the first type of enhancement, wherein the frames of first data comprise a first frame, a subsequent second frame adjacent the first frame, a subsequent third frame adjacent the second frame and a subsequent fourth frame adjacent the third frame, wherein the generating a fifth analyzer signal occurs during the third frame, wherein the storing at least some of the enhanced decoded first data comprises deriving the enhanced decoded first data from the first frame and the second frame, and wherein the fourth frame of the first data is substituted for the encoded enhanced first data.

118. (Original) A medium, as claimed in claim 94, wherein the computer program further performs the functionality comprising detecting speech activity, wherein

the generating a first analyzer signal comprises generating the first analyzer signal in response to the detecting speech activity.

119. (Original) A medium, as claimed in claim 94, wherein the first data comprises control data, and further comprising extracting the control data from the first data, storing the control data and reinserting the control data into the enhanced decoded first data to form the encoded enhanced first data.